

CLAIMS

What is claimed is:

1. A self-sealing material comprising a hydrogel adhered to pore walls of a
5 porous substrate.
2. The self-sealing material of claim 1 wherein the hydrogel is a polymer
selected from the group consisting of hydrophilic polyurethane, hydrophilic polyurea, and
hydrophilic polyureaurethane.
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3. The self-sealing material of claim 2 wherein the hydrogel is hydrophilic
polyurethane.
4. The self-sealing material of claim 3 wherein the hydrogel is hydrophilic
15 polyurethane made from the reaction of a polyol and a diisocyanate in a molar ratio of from
about 80:100 to about 20:100.
5. The self-sealing material of claim 4 wherein the hydrogel is hydrophilic
polyurethane made from the reaction of a polyol and a diisocyanate in a molar ratio of from
20 about 70:100 to about 40:100
6. The self-sealing material of claim 5 wherein the hydrogel is hydrophilic
polyurethane made from the reaction of a polyol and a diisocyanate in a molar ratio of from
about 65:100 to about 50:100.
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7. The self-sealing material of claim 1 wherein the porous substrate is made of
a material selected from the group consisting of: metals, metal oxides, and alloys;
ceramics; inorganic and organic materials; and mixtures thereof.
- 30 8. The self-sealing material of claim 7 wherein the porous substrate is made of
an organic or organometallic polymer.
9. The self-sealing material of claim 8 wherein the porous substrate is made of
an organic polymer selected from the group consisting of: acrylic polymers; polyolefins;
35 polyesters; polyamides; poly(ether sulfone); polytetrafluoroethylene; polyvinyl chloride;
polycarbonates; and polyurethanes.

10. The self-sealing material of claim 9 wherein the porous substrate is made of a polyolefin.
11. The self-sealing material of claim 1 wherein the porous substrate is made of
5 a single-component material, a multi-component material, or a woven or non-woven fibrous materials.
12. A process for making a self-sealing material which comprises forming a mixture comprising a hydrogel material and a substrate material and heating the mixture to
10 the sintering temperature of the substrate material to form a porous substrate, wherein the sintering temperature is greater than the melting point of the hydrogel material.
13. The process of claim 12 wherein the hydrogel material is selected from the group consisting of hydrophilic polyurethane, hydrophilic polyurea, and hydrophilic
15 polyureaurethane.
14. The process of claim 13 wherein the hydrogel material is hydrophilic polyurethane.
- 20 15. The process of claim 12 wherein the porous substrate material is a polymer selected from the group consisting of: acrylic polymers; polyolefins; polyesters; polyamides; poly(ether sulfone); polytetrafluoroethylene; polyvinyl chloride; polycarbonates; and polyurethanes.
- 25 16. The process of claim 15 wherein the porous substrate material is a polyolefin.
17. A product of the process of claim 12.
- 30 18. A process for making a self-sealing material which comprises immersing at least part of a porous substrate in a solution comprising a non-aqueous solvent and a hydrogel material.
19. The process of claim 18 wherein the non-aqueous solvent is selected from
35 the group consisting of ethers and alcohols.
20. The process of claim 19 wherein the non-aqueous solvent is ethanol or methanol.

21. The process of claim 18 wherein the hydrogel material is selected from the group consisting of hydrophilic polyurethane, hydrophilic polyurea, and hydrophilic polyurethane.

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22. The process of claim 21 wherein the hydrogel material is hydrophilic polyurethane.

23. A product of the process of claim 18.

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24. A process for making a self-sealing material which comprises immersing at least a part of a porous substrate in a solution comprising at least one reactant under conditions suitable for the formation of a hydrogel material within pores of the porous substrate.

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25. The process of claim 24 wherein the at least one reactant is a prepolymer formed by reacting a polyol and a diisocyanate.

26. The process of claim 25 wherein the at least one reactant further comprises at least one of a catalyst and a chain extender.

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27. A product of the process of claim 24.

28. A process for making a self-sealing material which comprises coating fibers of a support material with a hydrogel and assembling the coated fibers in such a way as to form a porous substrate.

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29. A pipette tip which comprises: a hollow tube open at opposite first and second ends; a center member disposed between said opposite first and second ends; and a means for attaching the first end of the hollow tube to a suction device, wherein said center member comprises at least one pore or channel having an inner wall coated partially or completely with a hydrogel.

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30. A pipette tip which comprises: a hollow tube open at opposite first and second ends; a self-sealing plug member disposed between said opposite first and second ends; and a means for attaching the first end of the hollow tube to a suction device, wherein said self-sealing plug member comprises a hydrogel adhered to pore walls of a porous substrate.

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31. The pipette tip of claim 29 or 30 wherein the hydrogel is made of hydrophilic polyurethane.
- 5 32. The pipette tip of claim 30 wherein the porous substrate is made of a polyolefin.
33. A pipette comprising the pipette tip of claim 29 or 30.
- 10 34. A container for holding a liquid which comprises: an inner surface; an outer surface; and a self-sealing vent comprised of a hydrogel adhered to pore walls of a porous substrate, wherein gas or non-aqueous liquid can pass from the inner surface to the outer surface through the vent.
- 15 35. The container of claim 34 wherein the hydrogel is made of hydrophilic polyurethane.
36. The container of claim 34 wherein the porous substrate is made of a polyolefin.
- 20 37. An intravenous liquid delivery system which comprises: a container; a tube; a needle; and a self-sealing vent operatively attached to one another such that liquid can pass from the container and thru the tube and needle, wherein the self-sealing vent is comprised of a hydrogel adhered to pore walls of a porous substrate.
- 25 38. The intravenous liquid delivery system of claim 37 wherein the hydrogel is made of hydrophilic polyurethane.
39. The intravenous liquid delivery system of claim 37 wherein the porous substrate is made of a polyolefin.
- 30 40. A cap for facilitating purging of gas from a syringe containing liquid and gas which comprises: a tubular housing open at opposite first and second ends; a self-sealing plug member disposed between said opposite first and second ends and comprised of a hydrogel adhered to pore walls of a porous substrate; and a means for attaching the first end of the hollow tube to a syringe.
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41. The cap of claim 40 wherein the hydrogel is made of hydrophilic polyurethane.

42. The cap of claim 40 wherein the porous substrate is made of a polyolefin.

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